[0044] The membrane **3** acts as a support medium for the first and second series of conductors **2** and is preferably made from an electrically insulating material e.g. a suitable dielectric. In preferred embodiments, the first and second series of conductors **2** are completely contained within the membrane **3**, except for the appropriate end connections, which may preferably protrude from one or more sides of the membrane **3**. These end connections are used to connect the sensing conductors to a suitable scanning apparatus.

[0045] The preferred thickness range of the membrane **3** is dependent on the particular application of the touchpad. For example, in a touch screen application, where the wires are typically embedded in a glass membrane, the thickness may be about 4 mm to about 12 mm. In keypad applications, the membrane may be about 1 mm thick. If the membrane is embedded in masonry blocks forming part of an interactive wall for instance, the membrane may be about 10 cm thick. However, it is to be understood that the thickness of the membrane **3** can be altered depending on the requirements (e.g. sensitivity and flexibility for instance) of the touchpad.

[0046] Throughout the present specification, the combination of the membrane **3** and sensing conductors **2** will be referred to as the 'sensing layer'.

[0047] It is to be appreciated that the membrane **3** need not be limited to flat, or planar, configurations, and in fact, the membrane **3** may alternatively be arranged into non-planar, curved or angular configurations, in accordance with the present invention. Hence, any references herein to the "plane of the membrane" are to be taken to include both flat and non-planar configurations of the supporting medium, whereby the direction of the plane defined at a particular point along the surface of the membrane **3** corresponds substantially to the direction of a tangent at that point. Therefore, the plane of the membrane may be a surface contour tracing the shape of the membrane.

[0048] Referring again to **FIG. 3**, the means **4** to concentrate electric field between the sensing conductors **2** towards the plane of the membrane **3** is shown proximal to the first and second series of conductors **2**. In preferred embodiments, the means **4** is an electrically conductive medium, which is configured to allow capacitive variations to propagate directly via the conductivity of the medium. In these embodiments, the conductive medium **4** preferably has a resistivity in the range 100 ohms per square to 10,000,000 ohms per square. The desired resistivity of the conductive medium depends on the inter-conductor spacing between the sensing conductors **2**, since a wide spacing will require a lower resistivity medium to sufficiently accentuate the capacitive variation induced by a finger, in order to obtain a reliable interpolation of the finger's position.

[0049] In other preferred embodiments, the conductive medium **4** is configured to propagate capacitive variations via capacitive coupling, wherein the resistivity of the medium will be at least 1000 million ohms per square. In preferred embodiments, the conductive medium **4** is in the form of a conductive layer **4**, which covers at least a portion of the membrane **3**. The conductive layer **4** may cover the membrane **3** directly or indirectly and is electrically insulated from the sensing conductors **2** by virtue of the membrane material and/or the electrical insulation of the sensing conductors.

[0050] The conductive layer **4** has a preferred thickness in the range of about 25 microns to about 5 mm and is preferably about 1 mm to about 2 mm thick in a typical touchpad arrangement. However, it is to be appreciated that the thickness of the conductive layer **4** may be altered depending on the resistance required within the conductive layer **4**, since thinner layers have a higher resistance as compared to thicker layers.

[0051] In preferred embodiments, the conductive layer **4** is deposited directly onto an outer surface of the membrane **3** and is supported thereon. The conductive layer **4** may be deposited by any conventional technique, including but not limited to, electroplating, sputter coating, painting, spraying and screen printing/ink-jet printing with conductive ink.

[0052] Alternatively, if the conductive layer **4** is formed as a separate laminate, the layer **4** may be bonded to the outer surface of the membrane using any suitable hardening or non-hardening conductive adhesive.

[0053] In other embodiments, the function of the supporting medium may be provided by the means for concentrating the electric field, in that the concentrating means may also act as a support for the sensing conductors. A particular example would be wires bonded to the concentrating means using a non-conductive adhesive tape, or non-conductive adhesive for instance.

[0054] In an aspect of the present invention, that the conductive layer **4** has resistive and capacitive properties which force the touch sensing of the sensing conductors **2** to be substantially aligned with the surface contour of the membrane **3**. The conductive layer **4** distorts the capacitive field caused by the finger in a manner that causes touch sensing to be aligned substantially along the surface of the conductive layer, which in preferred embodiments traces the surface contour of the membrane **3**.

[0055] Referring once again to **FIG. 3**, the presence of the conductive layer **4** acts to concentrate the electric field between the sensing conductors **2**, towards the plane of the membrane **3**, so that when a finger **1** touches, or comes very close to the conductive layer **4**, the finger induces a change in capacitance of about 0.5% to about 5% above the existing capacitive value. This change in capacitance is readily detectable by the sensing conductors **2** as a strong capacitive signal which is accentuated by the conductive layer **4**.

[0056] The induced signal is significantly larger due to the presence of the conductive layer, than would be produced in the absence of such a layer, due to the concentration of the sensing conductor electric fields towards the membrane **3**. The capacitive signal spreads radially away from the point of touch with a strength that decreases with increasing distance from the touch point. In embodiments in which the conductive layer **4** is configured to propagate capacitive variations directly via the conductivity of the layer, the rate of capacitive signal attenuation is found to be related to the resistance of the layer, such that highly conductive (low resistance) layers spread the signal over a wider area of the layer, as opposed to low conductivity (high resistance) layers which spread the signal over a much smaller area. If the conductive layer **4** is uniform in thickness and spatial extent, the capacitive signal will spread out evenly in all directions from the touch point.

[0057] Any variations in resistance across the conducting layer **4** have an effect on the linearity of the signal spread. However, relatively small variations in resistance produce